

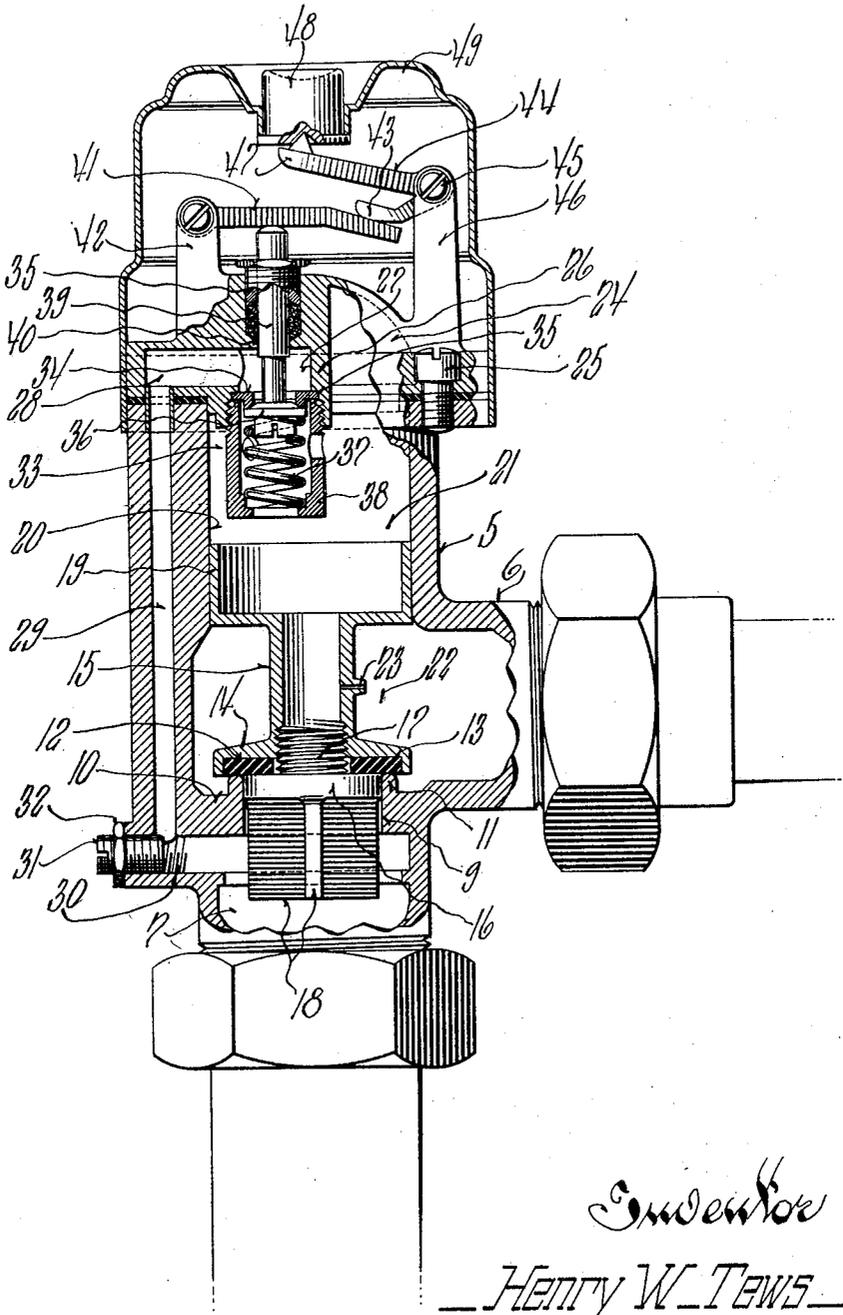
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H. W. TEWS

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PLUMBING FIXTURE

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UNITED STATES PATENT OFFICE

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PLUMBING FIXTURE

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This invention relates to certain new and useful improvements in plumbing fixtures and refers more particularly to flush valves adapted to be operated by depressing a push button.

An object of this invention is to simplify the construction of flush valves of the character described and to reduce the overall dimensions by arranging all of the elements into a compact unitary structure.

Another object of this invention resides in the provision of a flush valve of the character described having a push button actuated relief valve which is of compact construction and is entirely carried by the hood or cover of the device to facilitate assembly.

And a further object of this invention resides in the provision of a flush valve of the character described which is so constructed as to present a pleasing external appearance.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

The single figure is a transverse sectional view through a plumbing fixture embodying my invention.

Referring now more particularly to the accompanying drawing, the numeral 5 designates the body or casing of my improved valve, which has an inlet 6 and an outlet 7 connected through a valve opening 9 formed in a transverse horizontal wall 10 disposed between the inlet and outlet. An annular valve seat 11 surrounds the opening 9 at its upper periphery, and is normally engaged by a valve 12 to close the inlet from the outlet.

The valve 12 has a valve disc, or the like, 13 secured to the underside of the lower flange 14 of a substantially spool shaped plunger 15, by a retaining member 16 having a central stud 17 threaded into the tubular stem of the plunger. Radial fins 18 extend from the member 16 and project through the opening 9 when the valve is seated.

The plunger 15 is slidable in the casing to open and close the valve and is guided for vertical movement by a cup-shaped piston 19, which forms the other flange of the spool shaped plunger and is slidable in a bore 20 formed in the casing above the wall 10. The piston 19 divides the interior of the casing into an upper chamber 21 and a lower chamber 22. The lower chamber 22 is in direct communication with the inlet 6 and with the upper chamber 21 through a small bleed opening 23 in the stem of the plunger, so that the fluid enters both chambers to equalize the pressure on opposite sides of the piston whereby the valve 12 closes by gravity and is held closed by the fluid above it.

The upper open end of the casing 5 is closed by a hood or cover 24 which is secured thereto by means of screws 25 or the like and is provided with an internal enlargement 26 adjacent one side thereof. A vertical bore 27 extends upwardly into the enlargement to a point in line with a horizontal bore 28 formed in the cover member and with which a by-pass opening 29 communicates. The by-pass opening extends downwardly from the top of the casing to a point where it communicates with a horizontal bore 30 which connects with the outlet 7. A screw 31 provided with a lock nut 32 is threaded in the outer end of the bore 30 to provide means for controlling the area of the by-pass passage, which thus communicates the upper chamber 21 with the outlet.

The by-passage, however, is normally closed by a relief valve indicated generally as at 33, and which includes a removable valve seat 34 received in a counter-bore 35 formed in the enlargement 26 downwardly of the bore 27 therein, and with which a valve 36 is normally engaged. The valve is yieldably urged to closed position by an expansible

spring 37 confined between the valve and the lower end of a cup-shaped housing 38 threaded in the counter-bore 35 with its inner end abutting the valve seat 34. The lower
 5 end of the cup-shaped member 38 and the side walls thereof are apertured to provide communication between the interior thereof and the chamber 21.

To provide means for opening the valve, a
 10 stem 39 extends upwardly therefrom and projects through a suitably packed opening 40 in the upper wall of the hood to be engaged by a lever 41 pivoted at one end to a
 15 support 42 extended upwardly from the hood at a point adjacent the stem. The opposite end of the lever 41 is adapted to be engaged by the short arm 43 of a bell crank lever 44 pivoted, as at 45, to a second support 46 extended upwardly from the hood member, the
 20 end of the other arm 47 of the bell crank lever being engageable by a push button 48 whereby depression of the button actuates the levers to effect opening of the valve 27. An enclosure 49 carried by the casing en-
 25 closes the levers and provides means for retaining the push button 48 in its proper position. It will be noted that by mounting the relief valve with its axis to one side of the center an arrangement of the levers is facilitated which provides maximum leverage
 30 within a comparatively small space.

Furthermore, the cup-shaped construction of the piston 19 effects a substantial reduction in the overall height of the device, by
 35 permitting the retaining member 38 to telescope into the piston as it is raised to open the main valve.

The operation of the valve is simple and efficient. When the push button 48 is depressed to open the relief valve, the upper
 40 chamber 21 is communicated through the by-passage with the outlet 7, thus permitting the displacement of the fluid therein, the speed of displacement depending upon the setting of the screw 31. The passage of fluid
 45 from the upper chamber permits the greater pressure within the lower chamber to raise the plunger and with it open the valve 12 thus affording direct communication between
 50 the inlet and outlet. After the initial actuation of the push button 48, it is released and the valve 36 closes. The main valve, however, is held open by the discharging fluid until a sufficient quantity has passed through
 55 the bleed opening 23 into the upper chamber 21 to equalize the pressure on opposite sides of the piston 19, whereupon the plunger is moved by gravity to close its valve 12.

From the foregoing description taken in
 60 connection with the accompanying drawing it will be readily apparent to those skilled in the art to which an invention of the character described appertains that I provide an
 65 improved flush valve which is extremely simple and effective in its operation and

which is of compact construction and has a pleasing appearance.

I claim:

1. In a valve of the character described including a casing having its open top closed
 70 by a cover and having an inlet connected with a source of fluid under pressure and an outlet normally disconnected from the inlet by a main valve, a plunger movable with
 75 the main valve and dividing the interior of the casing into an upper chamber and a lower chamber, said plunger having a bleed opening to permit fluid to enter the upper chamber, means communicating the upper
 80 chamber with the outlet through the cover and terminating in a vertical bore in the cover, a valve seat detachably mounted in the bore, a relief valve engageable with the valve seat to close said means, spring means
 85 yieldably urging the relief valve to its closed position, means carried by the cover for securing the detachable valve seat in position and providing a stop for the spring means, a valve stem extended through the cover,
 90 lever means engageable with the valve stem, and a push button for actuating the lever means to open the relief valve, opening of the relief valve permitting displacement of the fluid within the upper chamber to effect
 95 opening of the main valve.

2. In a valve of the character described, including a casing having an inlet and an outlet adapted to be disconnected by a main
 100 valve, a normally closed relief valve, means whereby opening of the relief valve effects the opening of the main valve, a stem for actuating the relief valve, a lever pivoted adjacent the relief valve stem and engageable
 105 therewith, a second lever having one arm engaged with the free end of said first-mentioned lever and pivoted at a point remote from the relief valve stem, and a push button engageable with the free end of the other
 110 arm of said second lever whereby pressure on the push button actuates the relief valve stem to open the relief valve.

3. In a valve of the character described, a casing having an inlet and an outlet and a
 115 piston chamber above the inlet and in axial alignment with the outlet, a valve member for closing the inlet from the outlet, a piston carried by the valve member spaced therefrom and slidable in the piston chamber to divide the casing into an upper and a lower
 120 chamber, the lower chamber being connected with a source of fluid under pressure at all times through the inlet, and the upper chamber being communicated with the lower chamber through a bleed opening to permit
 125 fluid to enter the upper chamber, a removable cover closing the upper chamber, said cover and casing having a passageway communicating the upper chamber with the outlet and said passageway terminating in a downwardly extending bore in the cover, a re-
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movable valve seat in the bore, a relief valve engageable with the valve seat to normally close the passageway between the upper chamber and the outlet, spring means yieldably urging the relief valve to closed position, a valve stem extending from the relief valve through and having a fluid tight fit in an opening in the cover, lever means on the exterior of the cover for depressing the valve stem to open the relief valve, opening of the relief valve permitting displacement of the fluid within the upper chamber to effect opening of the main valve, and a push button for actuating said lever means.

4. In a valve of the character described having a casing provided with an inlet connected with a source of fluid under pressure, an outlet and a main valve member normally closing the inlet from the outlet and dividing the interior of the casing into an upper chamber and a lower chamber, the lower chamber being connected with the source of fluid under pressure at all times, means permitting the fluid to enter the upper chamber whereby the pressure in both chambers is equal and the valve member is held in closed position by the fluid pressure, a cover for the casing closing the top of its upper chamber, said cover having a fluid chamber, means communicating the casing upper chamber with the outlet to permit the fluid therein to be discharged whereby the fluid pressure in the lower chamber opens the main valve to communicate the inlet and outlet, said means comprising the fluid chamber in the cover, means for communicating said fluid chamber with the outlet, and a normally closed relief valve between the fluid chamber in the cover and the casing upper chamber, a stem on the relief valve projecting through and above the top of the cover at one side of the longitudinal axis of the casing, cooperating lever means pivotally mounted above and from the cover, one of said lever means overlying the projected end of the valve stem, a push button for actuating the lever means to depress the valve stem.

5. In a valve of the character described, having a casing provided with an inlet connected with a source of fluid under pressure, an outlet and a main valve normally closing the inlet from the outlet and dividing the interior of the casing into an upper chamber, the lower chamber being connected with the source of fluid under pressure at all times, means permitting the fluid to enter the upper chamber whereby the pressure in both chambers is equal and the valve member is held closed by the fluid pressure, a cover for the casing and closing the top of the upper chamber, said cover having a fluid chamber, means connecting the upper chamber with the outlet to permit the fluid therein to be discharged whereby the fluid pressure in the lower chamber opens the main valve to communicate the inlet and outlet, said means comprising the

fluid chamber in the cover, means for communicating said fluid chamber with the outlet, and a normally closed relief valve between the fluid chamber in the cover and the casing upper chamber, a stem on the relief valve, projecting through and above the top of the cover, and lever means above the cover and carried thereby for depressing said valve stem to open the relief valve and a shell enclosing the lever means and slidably mounting a push button for operative engagement with the lever means.

6. In a valve structure of the character described, including a casing having an inlet and an outlet adapted to be disconnected by a main valve, a cover for the casing, a normally closed relief valve carried at the underside of the cover, fluid pressure means to effect opening of the main valve upon opening of the relief valve, a stem for actuating the relief valve extending outwardly through and having a fluid tight fit in an opening in the cover, lever means carried by the top of the cover for depressing the stem to open the relief valve, a hood adapted to enclose the cover and the lever means, and a push button carried by the hood for actuating the lever means.

7. In a valve of the character described, including a casing adapted to be filled with fluid and having an inlet and an outlet and a main valve normally closing the inlet from the outlet, a relief valve within the casing which when open effects the opening of the main valve, a stem on the relief valve extending externally through one wall of the casing, cooperating levers for depressing the relief valve stem, one of said levers engaging the relief valve stem, a push button engaging the other of said levers, said levers providing a mechanical advantage to facilitate opening of the relief valve by actuation of the push button, and means mounting the levers in operative relationship with each other and with said valve stem.

In testimony whereof I have hereunto affixed my signature.

HENRY W. TEWS.

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